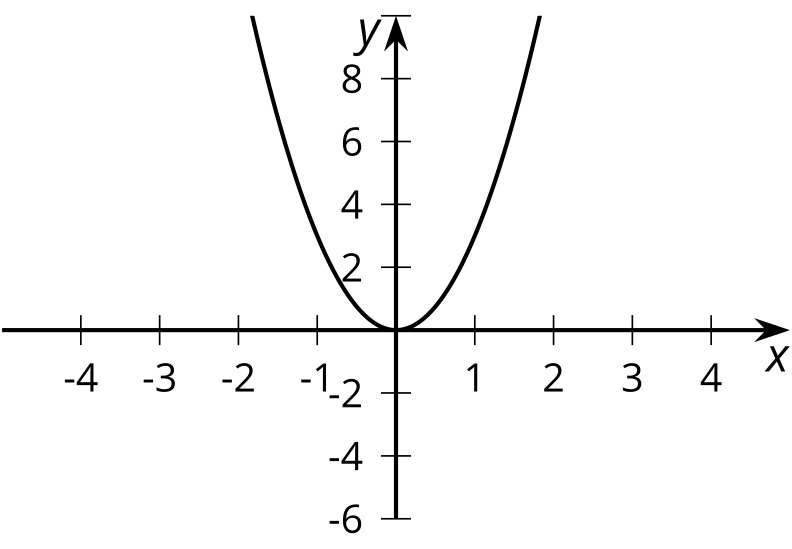
## Unit 6 Lesson 13: Amplitude and Midline

### 1 Comparing Parabolas (Warm up)

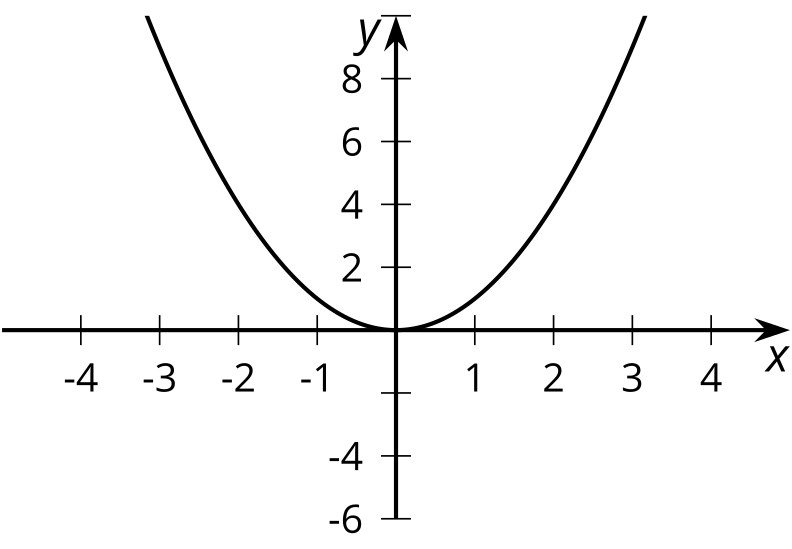
#### Student Task Statement

Match each equation to its graph.

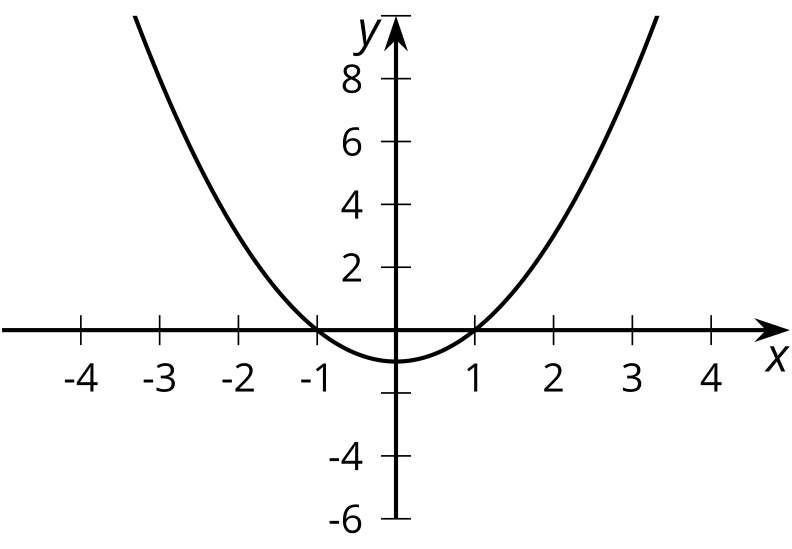
A



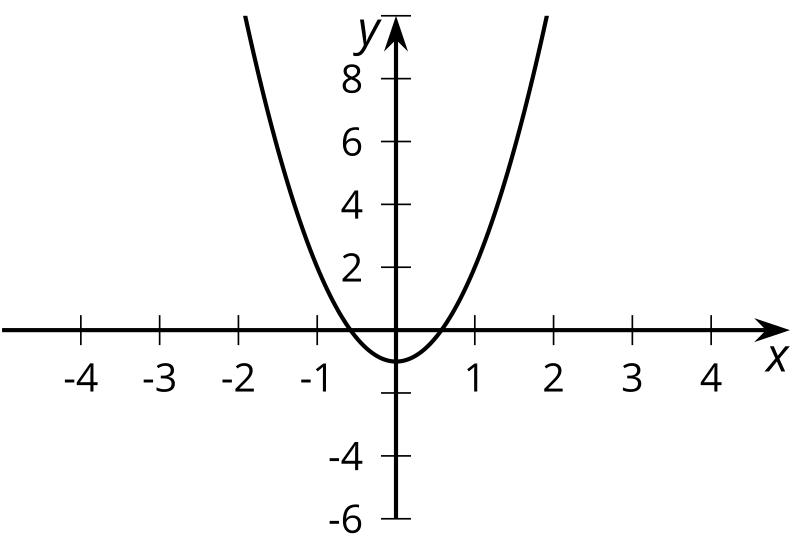
B



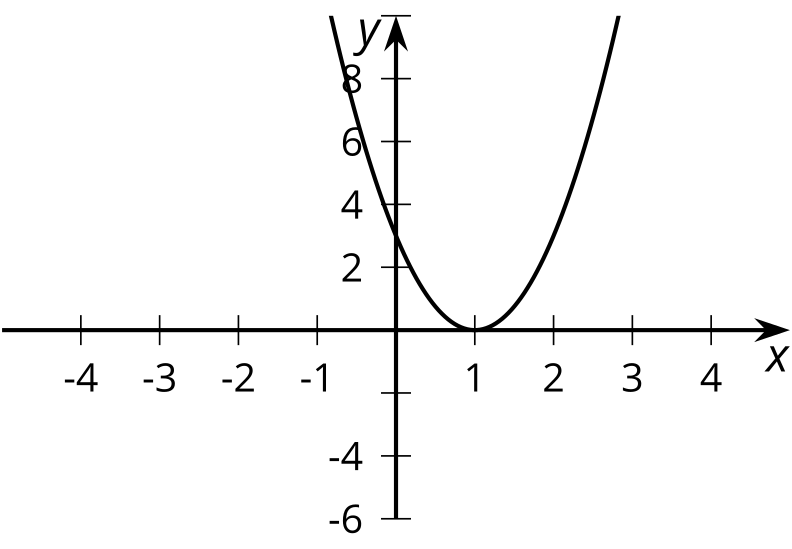
C



D



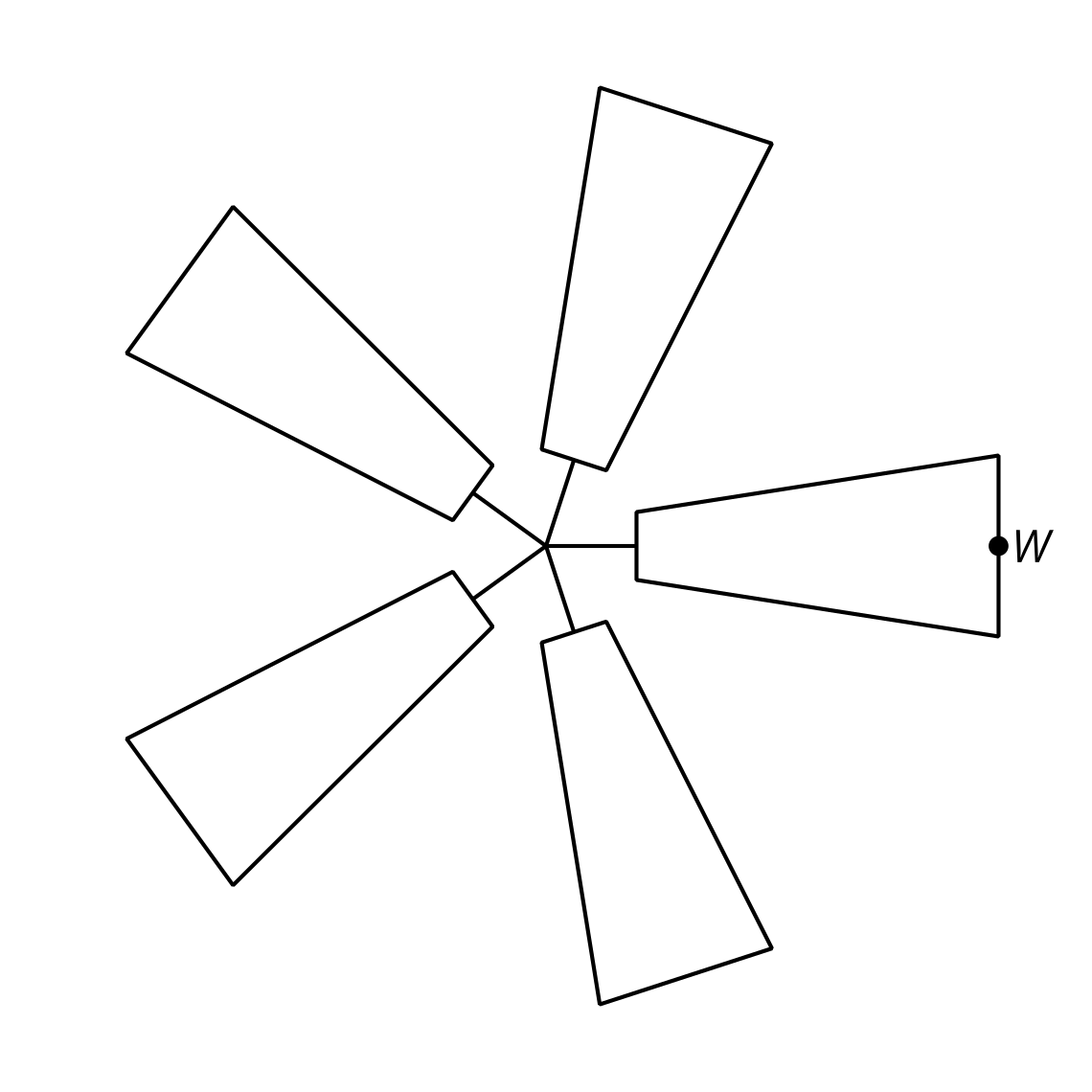
E



Be prepared to explain how you know which graph belongs with each equation.

### 2 Blowing in the Wind

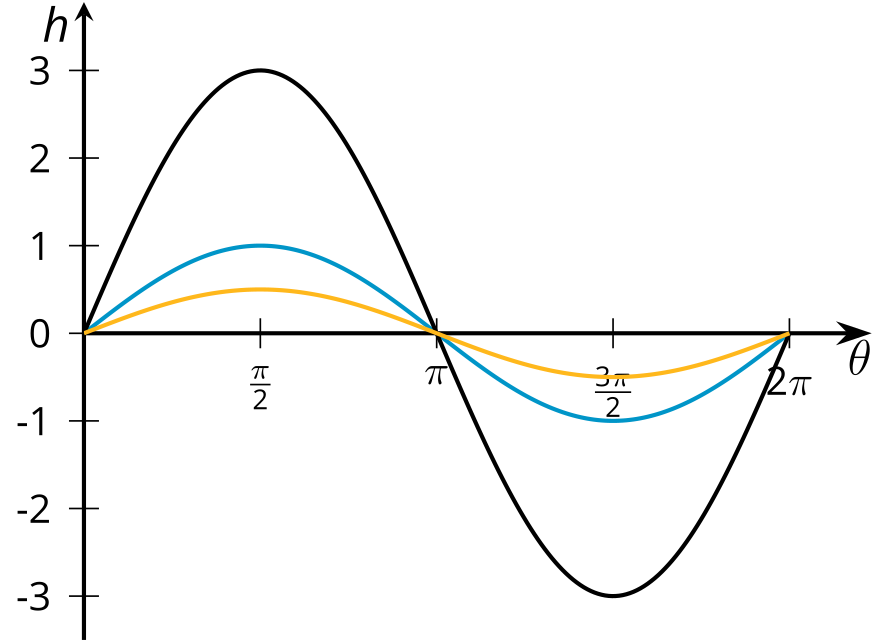
#### Student Task Statement



Suppose a windmill has a radius of 1 meter and the center of the windmill is on a coordinate grid.

1. Write a function describing the relationship between the height of and the angle of rotation . Explain your reasoning.
2. Describe how your function and its graph would change if:
   1. the windmill blade has length 3 meters.
   2. The windmill blade has length 0.5 meter.
3. Test your predictions using graphing technology.

#### Activity Synthesis

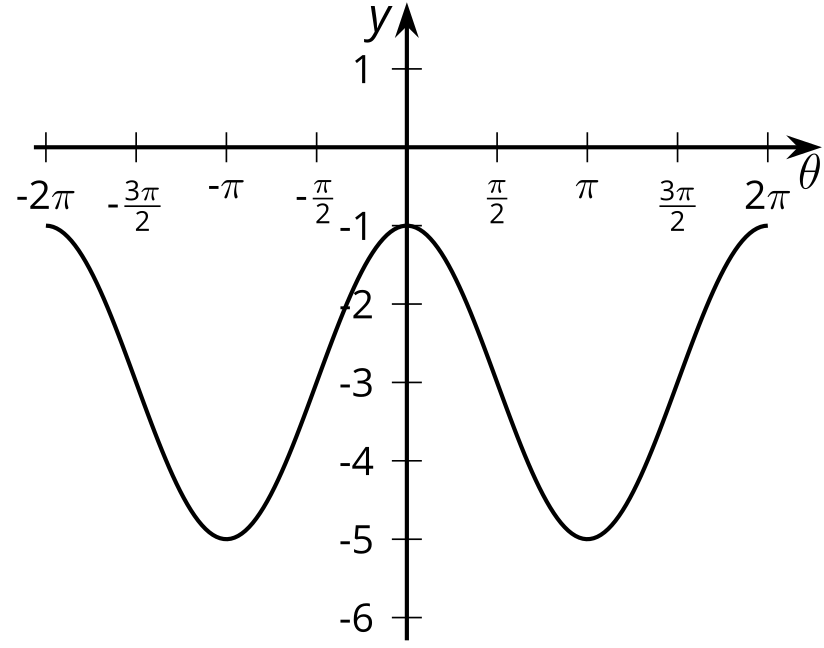


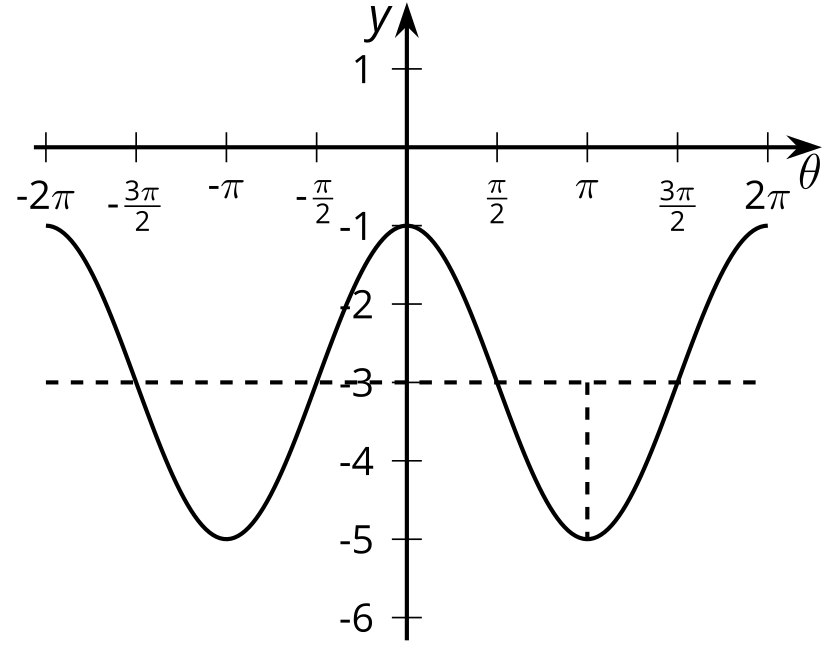
### 3 Up, Up, and Away

#### Student Task Statement

1. A windmill has radius 1 meter and its center is 8 meters off the ground. The point starts at the tip of a blade in the position farthest to the right and rotates counterclockwise. Write a function describing the relationship between the height of , in meters, and the angle of rotation.
2. Graph your function using technology. How does it compare to the graph where the center of windmill is at ?
3. What would the graph look like if the center of the windmill were 11 meters off the ground? Explain how you know.

#### Images for Activity Synthesis







© CC BY 2019 by Illustrative Mathematics®